

HUMAN HEALTH & DISEASE

Health ^{for a long time} _{was considered} State of body & mind where there is Balance of human _{sys}

Indian Ayurveda
System of medicine

Said by

Hippocrates
(Early Greek)

It was thought that → Person with 'black bile' belonged to → Not personality
→ would have fever -s.

This idea was arrived at by

Pure Reflection though

William Harvey's → Blood circulation discovery using ^{Experimental method}

Demonstration of normal body temp in person with black bile.

In Later years
↓ biology stated

Mind influences
↓ through

neural system

Endocrine system

our Immune system

which maintains

Health

* Mind mental state

can affect our

Health

Health is affected by

Genetic disorders

deficiencies with which a child is born & which child inherits from parents to offsprings.

Infections

Lifestyle

including food
↓ water
↓ rest
↓ exercise

Health

does not only mean

defined as

"absence of disease"

OR
"physical fitness"

When people are healthy

State of complete

physical mental social

well being

They are more efficient at work

Increases productivity

Brings economic prosperity

increase longevity of people

decreases
• IMR
• MMR

To maintain Good health

Balanced diet
Personal hygiene
Regular exercise

Yoga has been practised since time immemorial.

Physical health

Mental health

to achieve

To achieve good health

Maintenance of hygiene of food & water

Control of vectors

Proper disposal of waste

Immunisation/Vaccination

Awareness about disease & its effects on bodily functions

Not healthy / Disease → When '1 or more' organs or system of body adversely affected
characterised by - appearance of various signs & symptoms

Infectious

- Very common
- Every one of us suffer from these

AIDS - fatal

* AIDS & cancer
kill a large no of people worldwide.

Non-infectious - a/c.

CANCER - major cause of death

Drug & Alcohol abuse

COMMON DISEASES IN HUMANS

Wide range of organisms → PATHOGENS → disease causing organism

→ Bacteria
→ Viruses
→ Fungi
→ Protozoans
→ Helminthes

Most parasites → pathogens → cause harm to Host by living in them or on them

→ multiply → through many ways → can enter body → interfere with normal vital activities

Pathogens → have to adapt to life within the environment of host

Example → morphological damage (way of surviving at low pH) → functional damage (resisting digestive enzymes)

TYPHOID → caused by Salmonella typhi (pathogenic bacterium)

enters through Contaminated food & water

to SMALL INTESTINE → migrate to other organs through blood.

SYMPTOMS

- Sustained high fever (39° to 40°C) → $100 - 101^{\circ}\text{F}$
- Weakness
- Stomach pain
- Constipation
- Headache
- Loss of appetite
- Infection at perforation & death

Common symptoms

severe case

CONFIRMATORY TEST - WIDAL TEST

CLASSIC CASE IN MEDICINE - Mary Mallon (Nickname - Typhoid Mary)

Food she prepared → "Typhoid carrier"

continued to spread typhoid for several years

Cook by profession

Through

NEUMONIA

Bacteria responsible

Streptococcus Pneumoniae
Haemophilus Influenzae

infects

alveoli in Lungs
air filled sacs

as result they get

filled with fluid

symptoms

severe problems in respiration

leading to

fever chills Cough headache

common symptoms

Lips

Finger nails

turn

gray to

Bluish

In severe cases

* Infection occurs by

by

inhaling droplets/aerosol released by infected person.

Bacterial disease

by

sharing utensils, glasses with infected person.

Typhoid

Pneumonia

Dysentery

Plague

Diphtheria

* Many virus caused disease in human beings.

COMMON COLD

caused by

Rhino Virus

infects

Nose

~~Lungs~~

Respiratory passage

One of the most infections which causes no disease

represent one such group of viruses,

characterised by

Nasal congestion

Nasal discharge

Sore throat

Hoarseness

cough

headache

fatigue

(lasts for 3-7 days)

Infection is caused by

healthy person

Inhaling directly, droplets directly from cough or sneezes of infected person

indirectly cause infection in

transmitted by pens, book, cups, door knobs, mouse, computer keyboard and

AMOEBIASIS

caused by

Protozoan parasite Entamoeba Histolytica

SYMPTOMS

Constipation

Abdominal pain

Cramps

Stools

excess mucus

blood clots

→ Mechanical carriers : Houseflies

transmit

Parasite from

faeces of infected person

contaminating them

Food

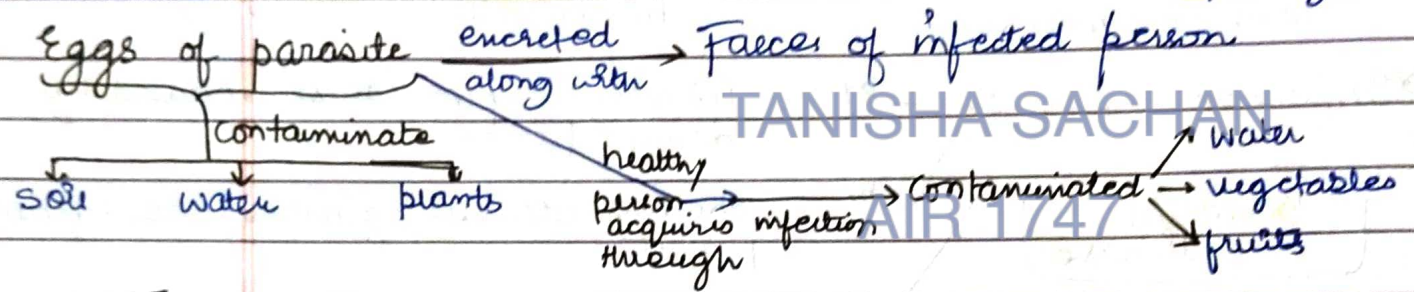
to

a Main source of infection → Drinking water contaminated by fecal matter
Food

ASCARIASIS

caused by helminth → Ascaris (Round worm)
intestinal parasite

Symptoms
Internal bleeding Muscular pain Fever Anaemia Blockage of intestinal passage



FILARIASIS / Elephantiasis

caused by helminth filarial worm

Slowly developing inflammation (chronic) of the organs

in which they live for many years

causes { Wuchereria Bancrofti W. Malayi }

Pathogen transmitted by

usually in lymphatic vessels of lower limbs

Bite of female culex mosquito

* Genital organs gets affected resulting in Gross deformities

RINGWORMS

caused by many fungi belonging to genera

Microsporum
Trichophyton
Epidermophyton

one of the most infectious disease in man

Symptoms → Appearance of dry, scaly, lesions on skin, nails, scalp
accompanied by intense itching

* Heat & Moisture helps Fungi to grow → makes them thrive well in skin folds b/w toes

Ringworms acquired from soil, towels, clothes, comb → infected person

• Human → asexual
 BIOLOGY
 • Mosquito → sexual
 asexual

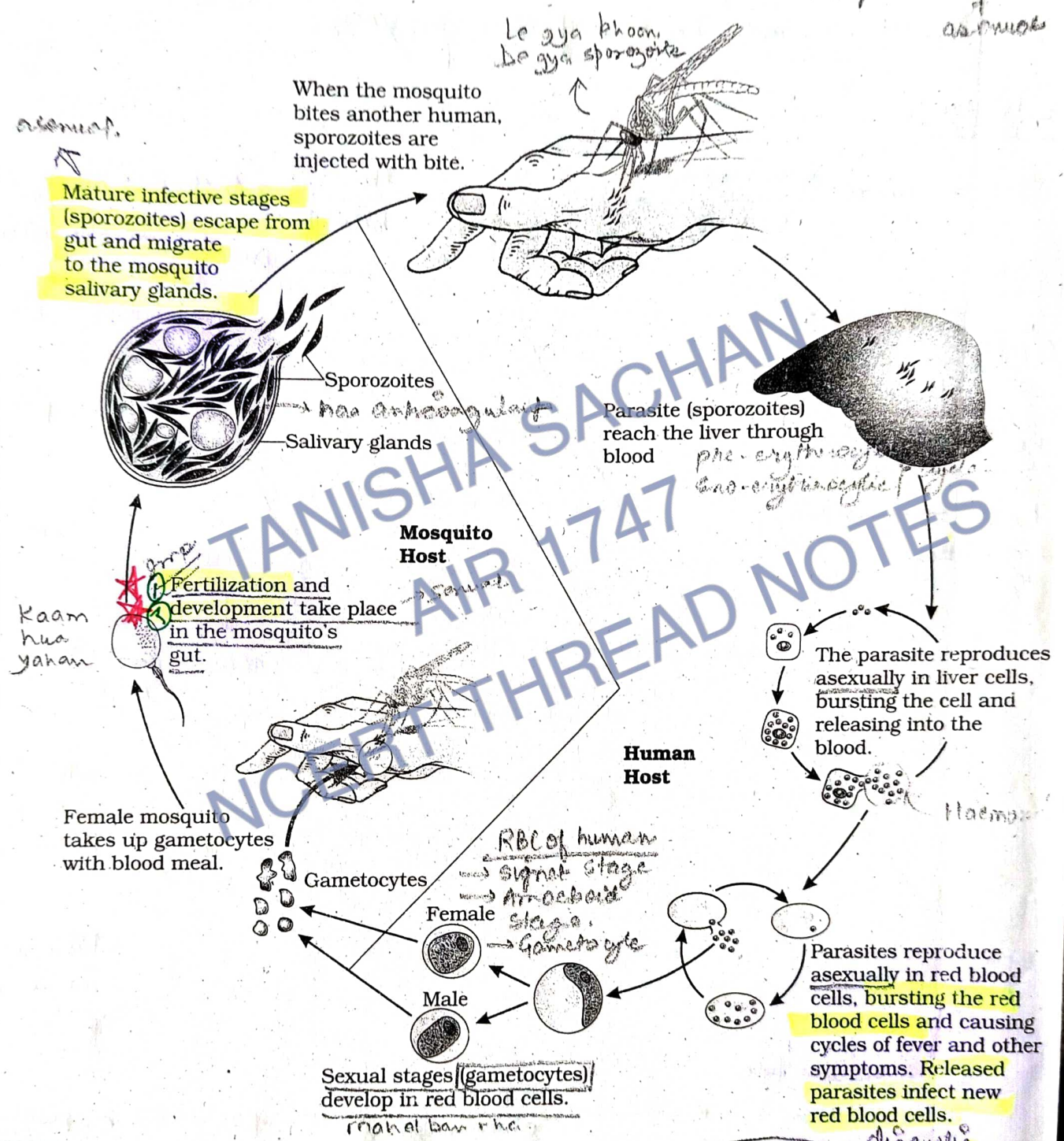


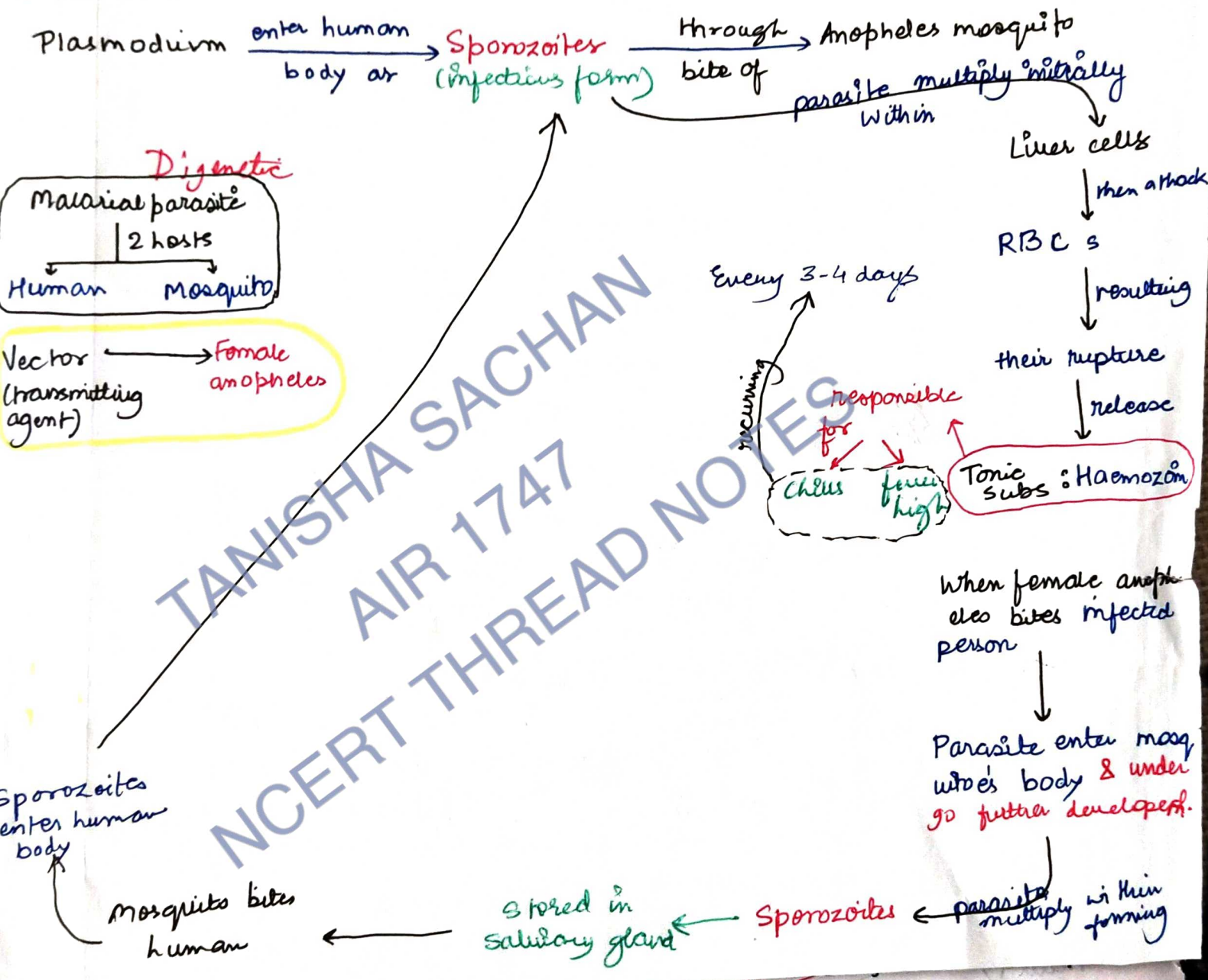
Figure 8.1 Stages in the life cycle of Plasmodium

Malaria caused by Protozoan: Plasmodium (tiny) many diff. species

- P. vivax
- P. malariae
- P. falciparum causes Malignant Malaria (most serious, fatal)

disease man has been fighting for years.

Life cycle



Maintenance of ^{personal} hygiene is **very important** for ^{public} prevention of many infectious disease.

① Measures for personal hygiene:

- 1) Keeping body clean
- 2) Consumption of clean drinking water, food, veget., fruit

② Public hygiene includes:

- 1) Proper disposal of ^{waste} excreta
- 2) Periodic cleaning & disinfection of ^{pools (cesspools)} water reservoirs tanks
- 3) Observing standard practices of hygiene in public catering.

measures are particularly essential where the infections agents transmitted through ^{food} water such as ^{hyphoid} Amoebiasis Ascariasis

③ In case of Air borne ^{pneumonia} disease such as ^{common cold}

above measures along with

close contact with infected person

close contact with infected person's belonging.

④ For disease like ^{malaria} Filariasis transmitted through vector (insects).

most important measure is control/eliminate vectors breeding places.

Can be achieved by:

- 1) Avoiding stagnation of water \rightarrow in around } residential areas.
- 2) Regular ~~bar~~ cleaning of household coolers Date ____/____/____
- 3) Use of mosquito nets.
- 4) Introducing fishes like Gambusia in ponds that feed on larvae of mosquito.
- 5) Spraying insecticides in \rightarrow ditches
 \rightarrow drainage area
 \rightarrow swamps.

6) Doors & Windows } should be provided with nets.

such measures more imp. in

Widespread incidence of Vector borne diseases like dengue & chikungunya in many parts of country.

Advancements made in biological science have armed us to effectively deal with many infectious diseases.

Vaccines & immunisation programs have enabled us to completely eradicate a deadly disease like Small pox.

Large no. of infectious diseases like

polio tetanus diphtheria pneumonia

have been controlled by use of vaccine to large extent.

Biotechnology

has helped us in making

newer safer

Vaccine

Discovery of antibiotic

& various other drugs

enabled us to effectively treat infectious diseases

IMMUNITY

Everyday → we are exposed to → A large no. of infectious agents.
 Body is able to defend itself from most of these foreign agents ← bcz → Disease ← only few results in
 → IMMUNITY: Overall ability of the host to fight → disease-causing organisms
immune system ← composed by

Immunity
12 types

Innate Immunity

Acquired Immunity

INNATE IMMUNITY

* Non specific type of defence → present at → Time of birth

→ accomplished by → providing different types of barriers to the entry of foreign agents into our body.

1st line of defence

2nd line of defence

4 types of barriers

Physical Barriers

Skin → main barrier
↓ prevents
entry of micro-organism

Mucus coating of epithelium of

Respiratory tract, Gastrointestinal tract, Urogenital tract

help in trapping microbes entering our body

Physiological Barriers

• Acid in stomach
• Saliva in mouth
• Tears from eyes

↓ all prevent
microbial growth

Cellular Barriers

• Certain types of leukocytes (WBC)
↓ like

PMN neutrophils
↓
Polymorpho nuclear leukocytes

Monocytes
↓
macrophages

Natural killer
↓
type of lymphocytes

↓
phagocytose & destroy microbes

Cytokine barriers

Virus infected cells ↓ secrete proteins

↓ called interferons

↓ which protect non infected cells

↓ from further viral infections

ACQUIRED IMMUNITY

→ 3rd line of defence

* pathogen specific

* characterised by memory

Body encounters Pathogen → for 1st time → Primary Response
 ↓
low intensity

Subsequent exposure → with same pathogen → Anam. respos.
 ascribed to the fact body appears to have memory of 1st encounter.
 highly intens. response ← Secondary response

Primary Response + Secondary Response → carried with the help of 2 special Lymphocyte in blood → B-lymphocyte, T-lymphocyte

B lymphocyte

produce
 Army of proteins
 in response to pathogens
 into blood to fight them
 these proteins called Antibody

Tu-lymphocyte

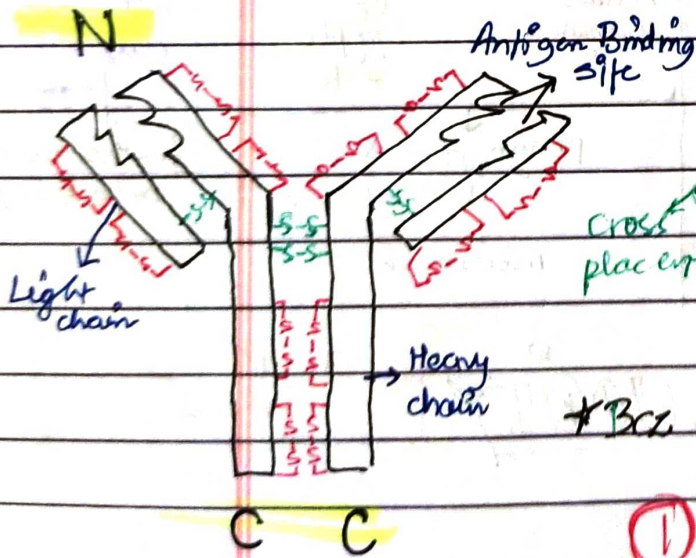
themselves
 Do not secrete antibodies
 but
 Help B cells to produce them.

Each antibody has → 4 peptide chains

2, small LIGHT CHAINS

H₂L₂

2, Longer HEAVY CHAINS



Different types of Antibodies

IgG, IgA, IgM, IgD, IgE
 cross placenta, colostrum → quantity decrease → allergy

* Bcz antibodies are produced in blood
 ↓ this response

① Humoral Immune Response

• Acquired immune response

② Cell mediated immune response (CMI)

→ mediated by T-lymphocytes
 → Responsible for → graft rejection

Grafts from Any source
 animal
 another primate
 Any human being
 cannot be made
 as it
 will be rejected sooner or later.

1) Tissue matching

2) Blood group matching

essential before

undertaking any graft

patient has to take immunosuppressant all her/his life.

* Body → able to differentiate
 self
 non-self.

Active & Passive Immunity

Host when exposed to antigens
 Living microbes
 Dead microbes
 Other proteins
 Antibodies produced in host bodies.

slow

ACTIVE IMMUNITY

takes time to give full effective response.

induce

Injecting microbes deliberately during immunisation.

Infectious organism gaining access into body during NATURAL INFECTION

* When Ready made antibodies directly given to protect body against foreign agents

called
 PASSIVE IMMUNITY

Colostrum

- Yellowish fluid
- Secreted by mother during initial days of lactation
- Has abundant antibody IgA

Foetus receives antibodies from mother through placenta.

Vaccination & Immunisation

Principle of Immunisation/Vaccination

based on

Memory of the immune system.

a preparation is introduced in body

Antigenic proteins of pathogen

Inactivated pathogen

Weakened pathogen.

Antibodies $\xrightarrow[\text{in body}]{\text{produced}}$ Against antigens \rightarrow Would neutralise pathogenic agent during actual infection.

Vaccines $\xrightarrow{\text{generate}}$ $\left\{ \begin{array}{l} \text{Memory B cells} \\ \text{Memory T cells} \end{array} \right\}$ that recognise infection pathogen quickly on subsequent exposure

Massive prod. of antibodies $\xleftarrow{\text{with}}$ overwhelm the invaders \leftarrow

If person $\xrightarrow[\text{with}]{\text{infected}}$ Some deadly microbes $\xrightarrow{\text{to which}}$ Quick immune response needed.

directly inject the $\xleftarrow{\text{we need to}}$ ① TETANUS $\xleftarrow{\text{as in}}$

Preformed antibodies OR Antitoxin preparation containing Antibodies to toxin

② SNAKE BITES

Injection \rightarrow Preformed antibodies against snake venom.

① & ②
positive immune
sation

★ Recombinant DNA technology

has allowed production of

★ antigenic polypeptides of pathogen

Vaccine prod. using this approach

Bacteria Yeast

Allow large scale prod. $\xrightarrow{\text{hence}}$ Greater availability of immunisation \leftarrow for

Example

Hepatitis B vaccine produced from Yeast

ALLERGIES

When u go to a new place \rightarrow suddenly start \rightarrow sneezing wheezing

for no explained reason

Some of us are sensitive to some particles in environment

could be due to

Allergy to

pollen

mites

different in different places

Exaggerated Response of Immune system to certain antigens
is called Allergy present in environment

* Substance to which such an immune response is produced

are called Allergens

Antibody prod. type

IgE

mites
↓
in dust

pollens

Animal dander

Symptoms of allergic reactions

Sneezing

Watery eyes

Running nose

Difficulty in breathing

Allergy is due to

Release of Histamine & Serotonin

from Mast cells

For determining Cause of allergy

patient exposed & injected

A small amt. of possible allergens

RRn studied then

Use of drugs like

anti histamine

adrenaline

Steroids

Symptoms of allergy quickly reduce

Modern day lifestyle resulted in lowered immunity & more sensitivity to allergens

Sensitivity to the environment

due to Allergy & Asthma

suffer from

more & more children in metro cities

This could be because of Protected environment provided in early life

AUTO-IMMUNITY

* Memory based Acquired Immunity Evolved in higher vertebrates
ability to differentiate foreign org. (eg. pathogen) from self cells based on

* Two corollaries of this ability

(1) Higher vertebrates can distinguish foreign molecules & foreign organisms
Smallest experimental immunology deals with this aspect

(2) Due to genetic & other unknown reasons body attacks Self cells

Auto immune disease

Damage to body results in

Example Rheumatoid Arthritis

affects many people in our society

Immune System in Body

★ Human Immune system consists

lymphoid organ
tissues
cells
soluble molecules

↓ like antibodies

in the sense

it recognises foreign antigens

plays an important role in

Respond to these & remember them

LYMPHOID ORGANS

◎ Organ where
→ origin
→ maturation
→ proliferation
of LYMPHOCTES occurs

Allergic Reactions

Auto-immune disease

Organ Transplantation

Primary Lymphoid Organ
Bone marrow
Thymus

Spleen
Lymph nodes
Tonsils
Secondary Lymphoid organ

immature lymphocytes differentiate to antigen sensitive lymphocytes

Peyer's patches of small intestine

Appendix

Provide site for interaction of lymphocyte with antigens
proliferate to become effector cells

NCERT THREAD NOTES

Bone Marrow → main lymphoid organ where All blood cells + lymphocytes produced

Thymus
• Quite large → at birth
• Receptor reducing in size with age till puberty → reduces to very small size
• lobed organ
• near heart
• beneath breastbone (sternum)
Micro-environment for development of T-lymphocyte

Spleen
→ LARGE (not small)
→ BEAN SHAPED
mostly contains lymphocytes & phagocytes
acts as "filter of the blood" by trapping blood borne micro-organisms
large reservoir of erythrocytes

LYMPH NODES
→ small solid structures located at different points along lymphatic system.
→ serve to trap micro-organisms & other antigens which get into lymph & tissue fluid
antigens trapped here responsible for activation of lymphocyte cause immune response

Lymphoid tissue located within lining of
called MALT (Mucosa associated lymphoid tissue) in human body constitute about 50% of lymphoid tissue
major tracts: Respiratory tracts, Digestive tracts, Urogenital tracts

Infectious disease

a group of symptoms

AIDS

stands for

Acquired Immunity Deficiency Syndrome

means

1st reported in 1981

~~Congenital disease~~

Deficiency of immune system, acquired during lifetime of an individual

25 yrs

Spread all over world
Killing > 25 million person.

HIV

Human Immunodeficiency Virus

not

a member of
Retrovirus

RNA genome
enclosed by envelope.

transmission by

- Sexual contact with infected person.
- By transfusion of contaminated blood
- By sharing infected needles in case of Intravenous drug abuse
- Infected mother to child through placenta.

- people with multiple sexual partners
- Drug addicts who take drug intravenously
- People who require repeated blood transfusion
- Child born to HIV infected mother.

Spread by

- mere touch
- physical contact

hence

It is imperative, for the physical & psychological well being

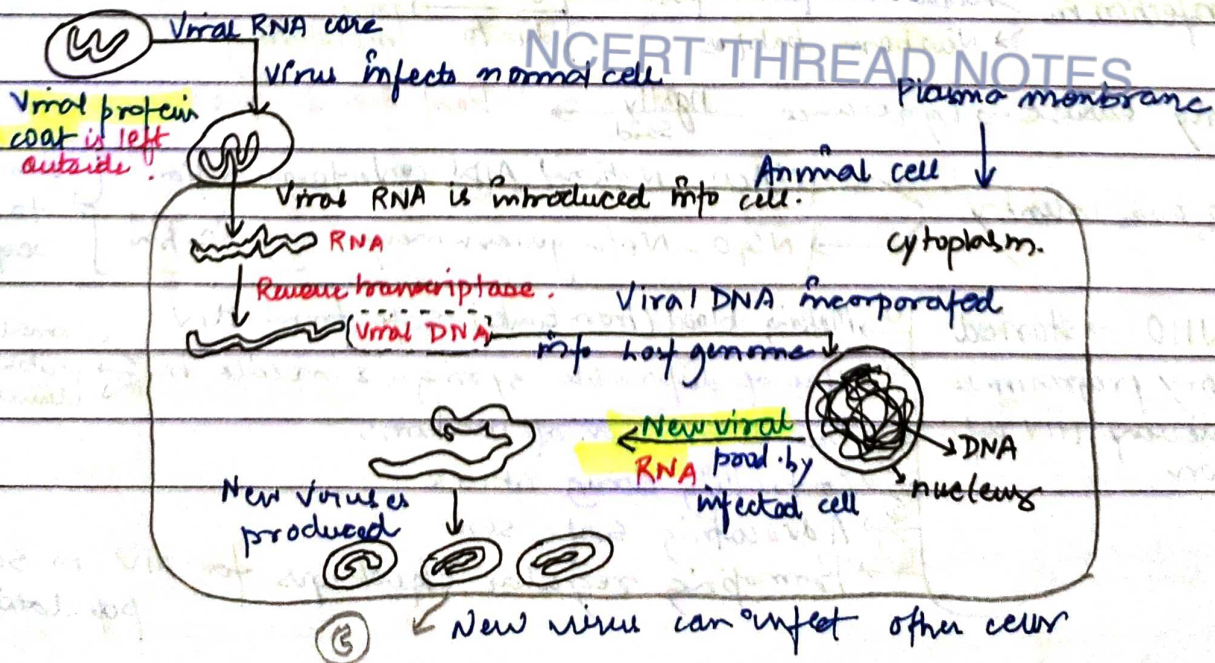
Body fluids

infection $\xleftarrow{\text{time lag}}$ appearance of symptoms

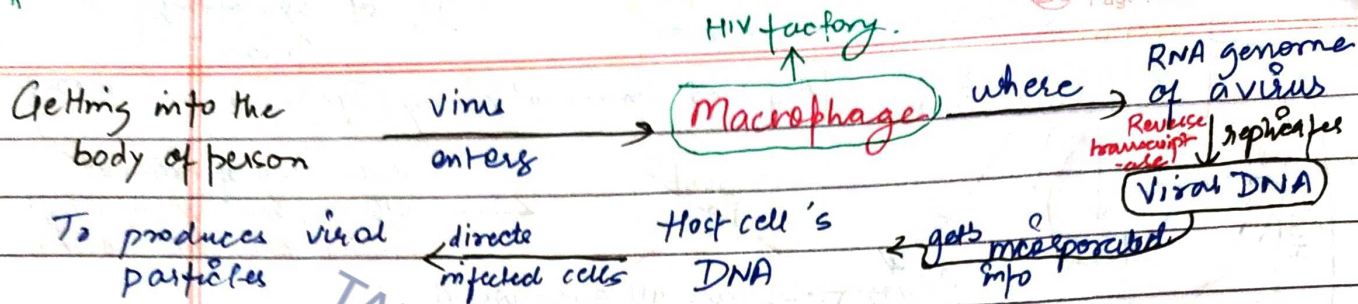
* Incubation period \rightarrow 5-10 yrs

that HIV/AIDS infected persons are not isolated from family & society

Retrovirus



★ Infected cell → can survive while viruses are being replicated & released.



SIMULTANEOUSLY,

HIV enters Helper T-lymphocytes (TH). → replicates & prod. Progeny viruses

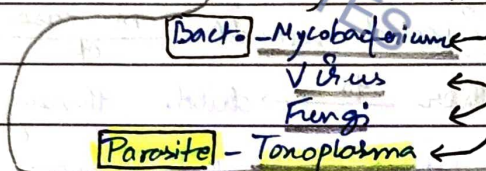
Progressive decrease in no. of TH cells

results in Blood & attack other TH cells. released info

during this period, person suffers from

During ↓ in TH cells, person starts suffering from infection that could have been otherwise overcome

- Bouts of fever
- Diarrhoea
- Weight loss



due to

* Patient becomes so immunodeficient → he/she unable to protect against infections

DIAGNOSTIC TEST for AIDS → Enzyme linked Immuno Sorbent assay (ELISA)

TREATMENT OF AIDS → **Retroviral Drugs** → Partially effective

- Prolong the life
- Doesn't prevent death, is inevitable

PREVENTION OF AIDS → No cure, so prevention is best.

pneumonia, Typhoid like

- HIV Spreads → due to conscious behaviour pattern not that it happens inadvertently.

- Infection in blood transfusion patients & newborn babies → poor monitoring

- Only cause → ignorance rightly said → "Don't die of ignorance"

- In our country → NACO - National AIDS control organisation, NGO - Non governmental organisation } doing a lot to educate people on AIDS.

- WHO → started many programmes to prevent HIV infection
 - ① Making blood (from banks) safe from HIV
 - ② Use of disposable syringes & needle in private hospitals
 - ③ Free distribution of condoms
 - ④ Controlling drug abuse
 - ⑤ Advocating safe sex
 - ⑥ Promoting regular checkups for HIV in susceptible populations

HIV → shouldn't be hidden ^{since} then → Infection may be spread to many more people.

CANCER

① most dreaded disease

② major cause of death all over the globe.

③ 2 million suffer from it.

Large no. of them die annually.

(*) Most interse areas of Research in
 → Biology
 → Medicine
 → Mechanism that underlie development of cancer or **oncogenic transformation** of cells.
 → Control of cancer
 → Treatment of cancer

In body
 → Cell growth
 → Differentiation
 } highly controlled & regulated

Normal cells show Property of **contact inhibition**

contact with other cells **inhibit** their uncontrolled growth.

↓ by virtue of which
 Cancer cells **have lost their property** → **RESULT** → Cancer cells continue to divide giving rise to **masses of cells**
 ↓ called **Tumours**

Benign Tumor

- ① normally remain confined to original positions
- ② Do not spread to other parts
- ③ Cause little damage.

Malignant tumor

- ① mass of proliferating cells called **neoplastic or tumor**
- ② Cells grow rapidly
- ③ **Invading & damaging** surrounding tissue cells
- ④ Cells actively divide & grow
- ⑤ Starve normal cells by **competing for vital nutrients**.

⑥ **METASTASIS** → **lost** property of malignant tumour cells sloughed off

reach → distant sites **through blood** → wherever they get lodged start new tumour there.

CAUSES OF CANCER & agents called Carcinogen

Physical Carcinogen

- ① Ionizing Radiation
 X rays
 γ rays

- ② Non ionizing Radiat.
 UV rays

causes **DNA damage**
 ↓ leading to **neoplastic transformation**

Chemical Carcin.

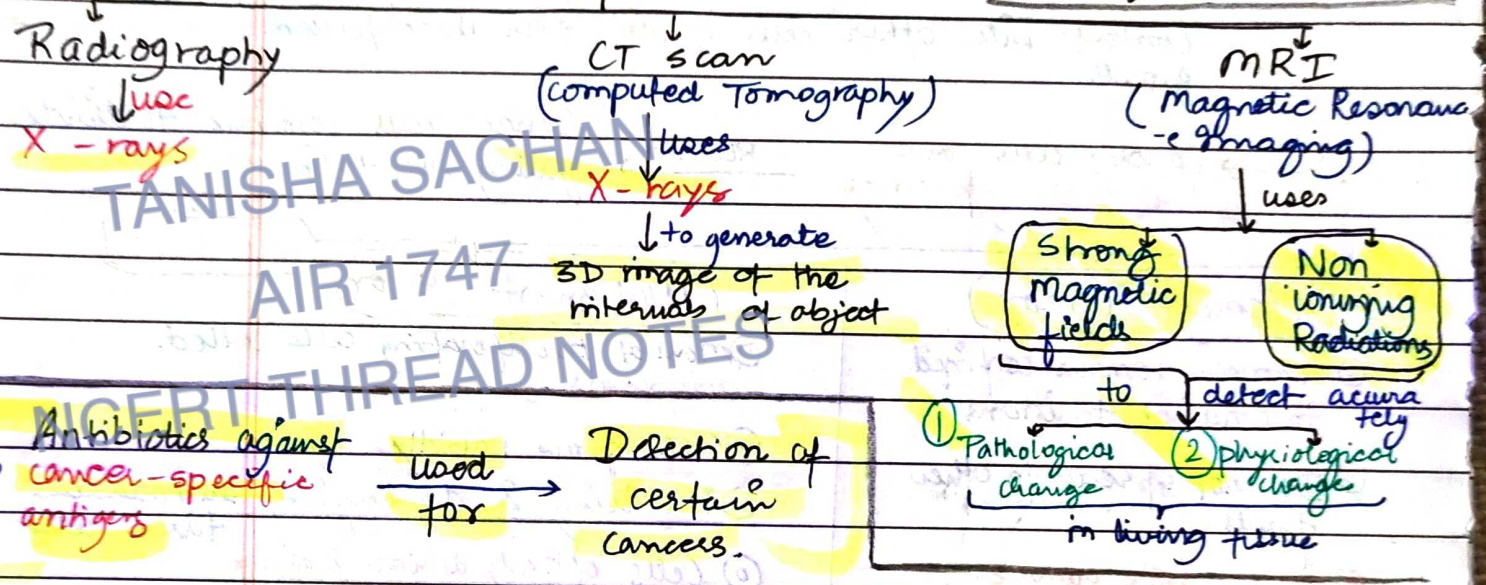
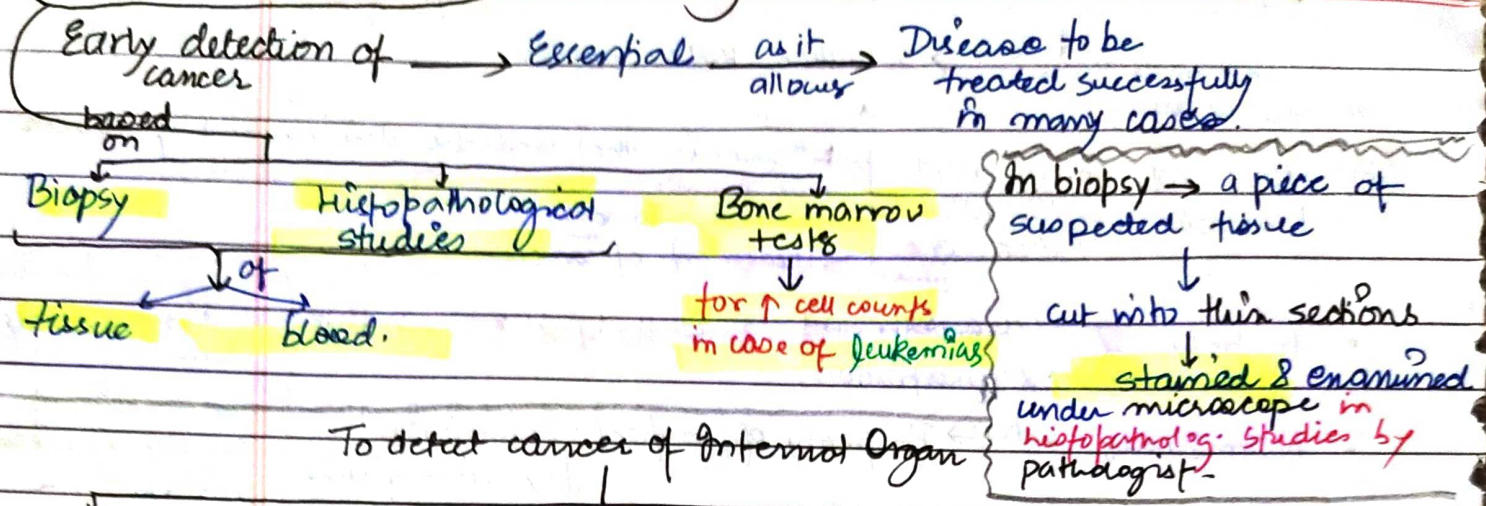
Present in
 ↓
Tobacco smoke

↓ causes
Lung Cancer

Biological Carcino.

Cancer causing viruses → **Oncogenic virus**
 ↓
genes have **Viral Oncogene**
 • Cellular oncogene/Protooncogene are identified in normal cells which when activated under certain cond.
Oncogenic transform. of cells

Cancer Detection & Diagnosis



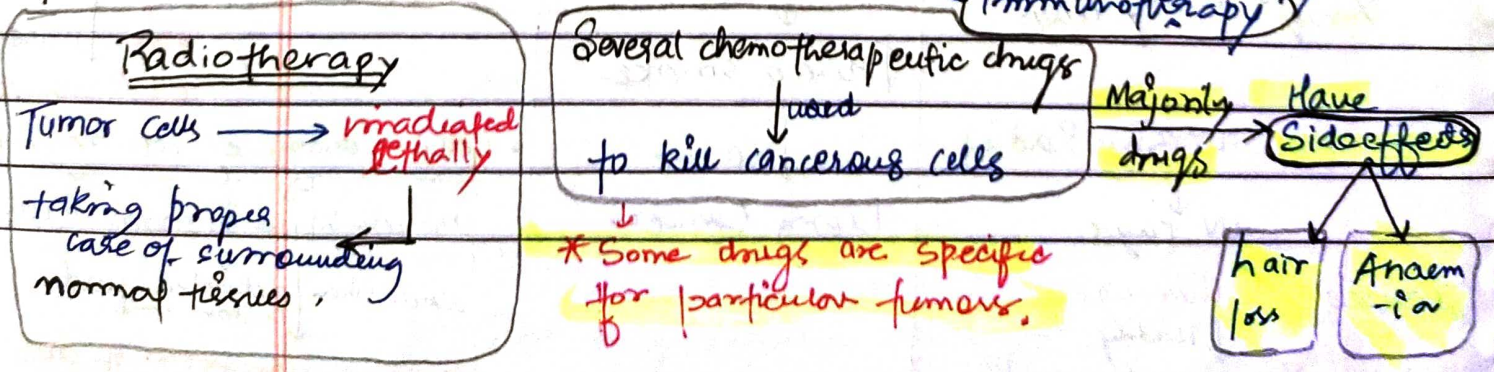
Techniques of molecular biology applied to detect Genes → Inherited susceptibility to certain cancers.

Identification of such genes which Predispose an individual to certain cancers → may be very helpful in Prevention of cancer.

Such individuals may be advised to avoid exposure to particular carcinogen to which they are susceptible [e.g. tobacco smoke]

[Lung Cancer] ← in case of

TREATMENT OF CANCER are



Most cancers treated by combination of
 surgery
 Radiotherapy
 Chemotherapy
 Tumor cells shown to Avoid $\left\{ \begin{array}{l} \text{detection} \\ \text{destruction} \end{array} \right\}$ by immune system

Patients are given α -Interferon } biological response modifiers?
 activates the immune system \rightarrow destroying tumor

DRUGS AND ALCOHOL USE

Drugs abused $\left\{ \begin{array}{l} \text{Opioids} \\ \text{Cannabinoids} \\ \text{Coca alkaloids} \end{array} \right.$
 * Majority of drugs obtained from Flowering plants
 * Some are obtained from Fungi
 especially in youths

OPIOIDS

Bind to \rightarrow Specific opioid receptors present in
 CNS
 Gastrointestinal tracts

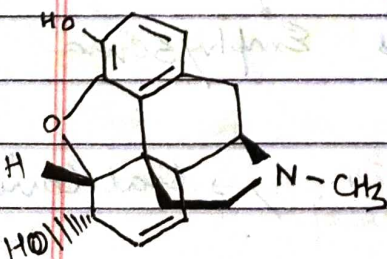
* Commonly called \rightarrow "Smacks"

chemically called
 Diacetylmorphine
 White bitter odourless Crystalline
 obtained by
 Acetylation of morphine
 extracted from

Laten of Poppy plant (Papaver somniferum)

Generally taken by
 1) snorting
 2) injection

Heroin \rightarrow depressant
 \rightarrow slows down body function



CANNABINOIDS

group of chemicals which interact with
 Cannabinoid receptor present in
 BRAIN

Natural cannabinoids
 obtained from
 Inflorescence of plant
 Cannabis sativa

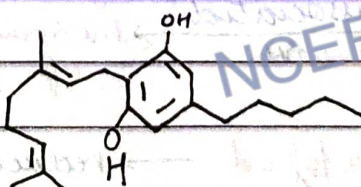
Flower tops of leaves of Resin of
 used in various combination
 to produce

Hashish charas Marijuana Ganja

Generally taken by
 Inhalation
 Oral ingestion

Effects on
 Cardiovascular system of body

Cannabinoids are abused by some sports person.



COCA ALKALOID

obtained from
 Erythroxylum Coca,
 native of South America

It interferes with \rightarrow transport of neurotransmitter
 of Dopamine

Cocaine commonly called coke crack

usually snorted

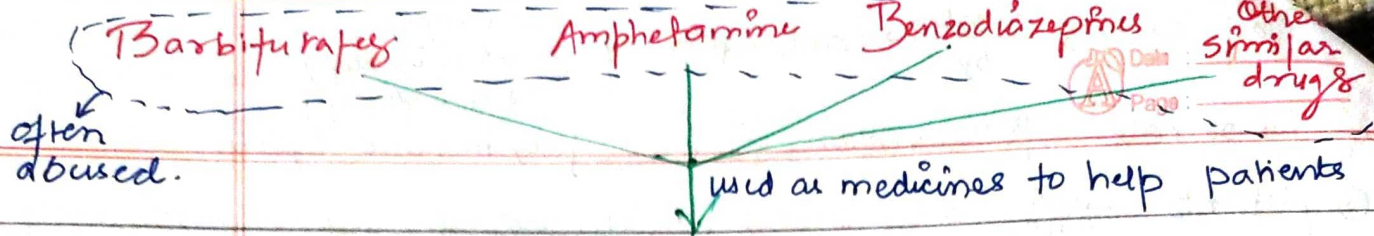
Potent stimulating action on CNS

Euphoria
 producing a sense of increased energy

Excessive dosage causes hallucinations of cocaine

Other plants \rightarrow Atropa belladonna cause hallucinations

Datura



Cope with mental illness like
 Depression Insomnia

* Morphine $\xrightarrow{\text{very effective}}$ Sedative Painkiller $\xrightarrow{\text{very useful for patients}}$ who have undergone surgery.

Several plants (Fruits, Seeds) $\xrightarrow{\text{having hallucinogenic properties}}$ used for 100 years in Folk medicine, Religious ceremonies, Rituals all over globe.

Drug Abuse — When these are taken for a purpose other than medicinal use or in amounts/frequency that impairs one's $\xrightarrow{\text{physical funct.}}$ $\xrightarrow{\text{physiological funct.}}$ $\xrightarrow{\text{psychological funct.}}$

Smoking \downarrow paves way for hard drugs

* Tobacco \rightarrow used by human beings for > 400 years. \rightarrow contains a large no. of chemicals subst. including

\swarrow smoked
 \searrow chewed
 \searrow Snuffed

① Adrenaline $\xrightarrow{\text{to release}}$ Adrenal Gland $\xleftarrow{\text{stimulates}}$ NICOTINE (an alkaloid)

② Nor-adrenaline $\xrightarrow{\text{Inh}}$ Blood circulation

Blood circulation $\xrightarrow{\text{raises}}$ ① Blood pressure, ② Heart Rate

Smoking is associated with increased chance of Lung, Urinary Bladder, Throat.

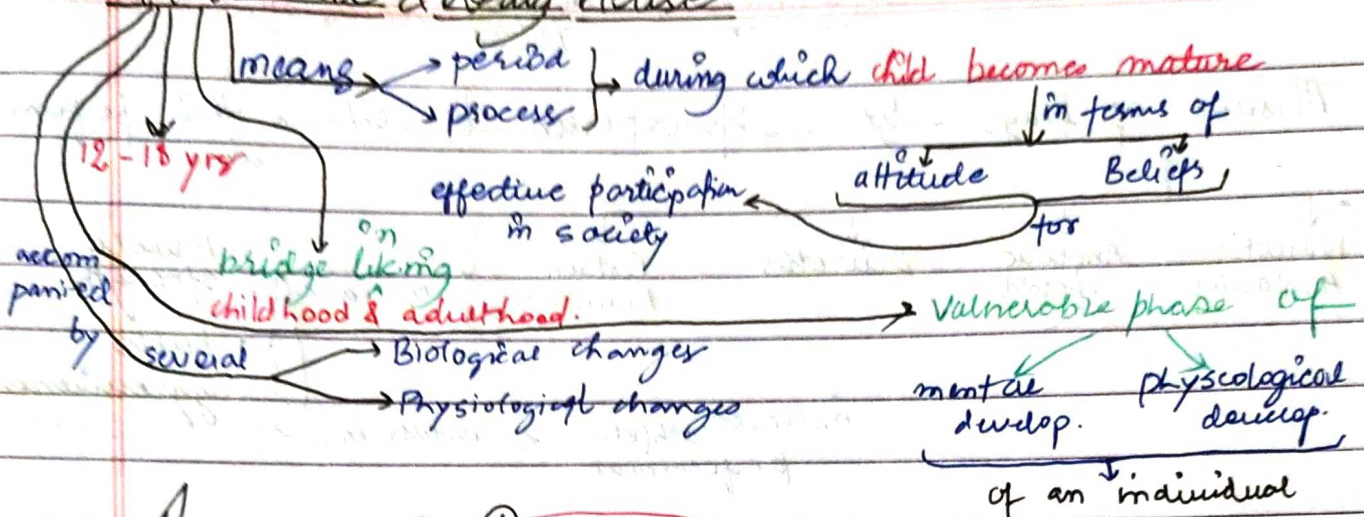
Coronary heart disease, Gastric Ulcer, Bronchitis, Emphysema

Tobacco Chewing associated with increased risk of cancer of Oral Cavity

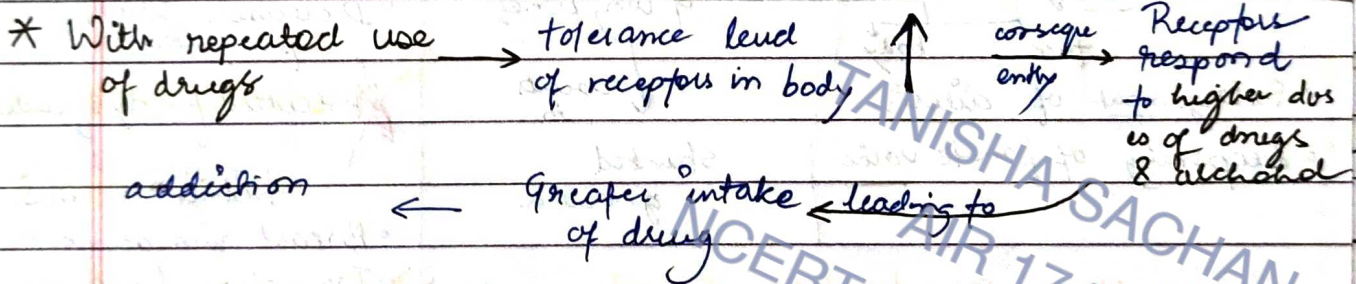
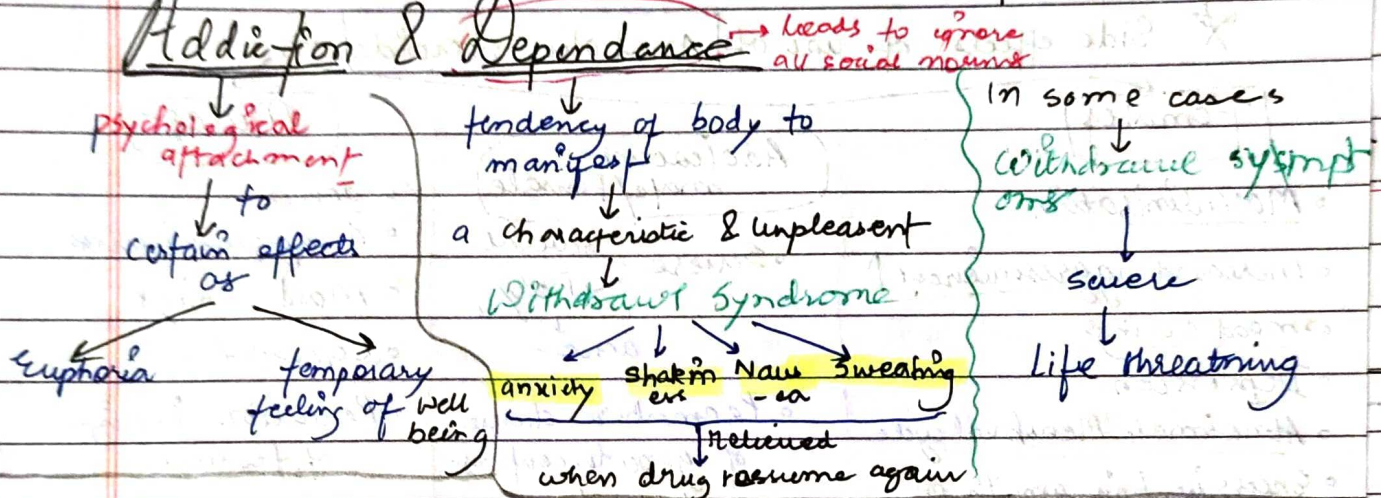
$\rightarrow \uparrow \text{CO in blood} \rightarrow \text{reduces conc. of haemoglobin } O_2 \rightarrow O_2 \text{ deficiency in body} \rightarrow \text{causes}$

on cigarette packing → one cannot miss statutory warning

Adolescence & Drug Abuse

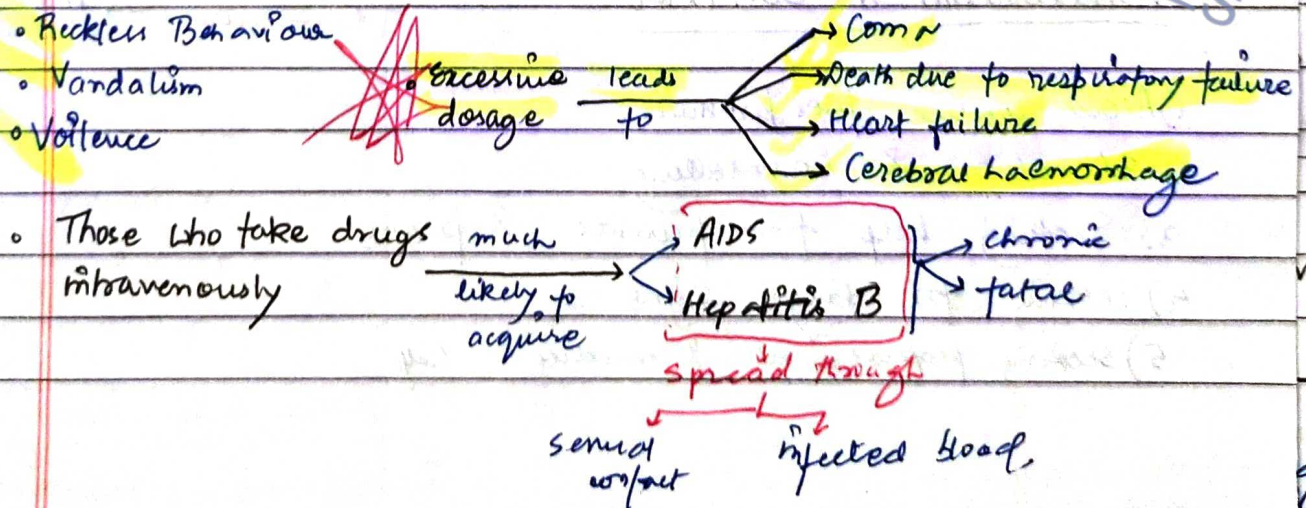


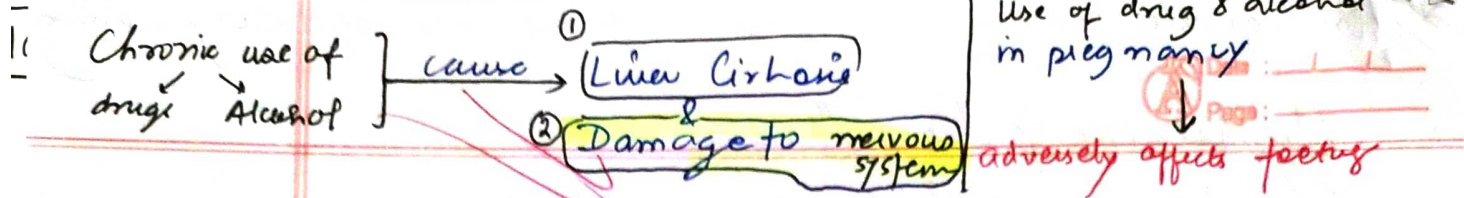
Addiction & Dependence



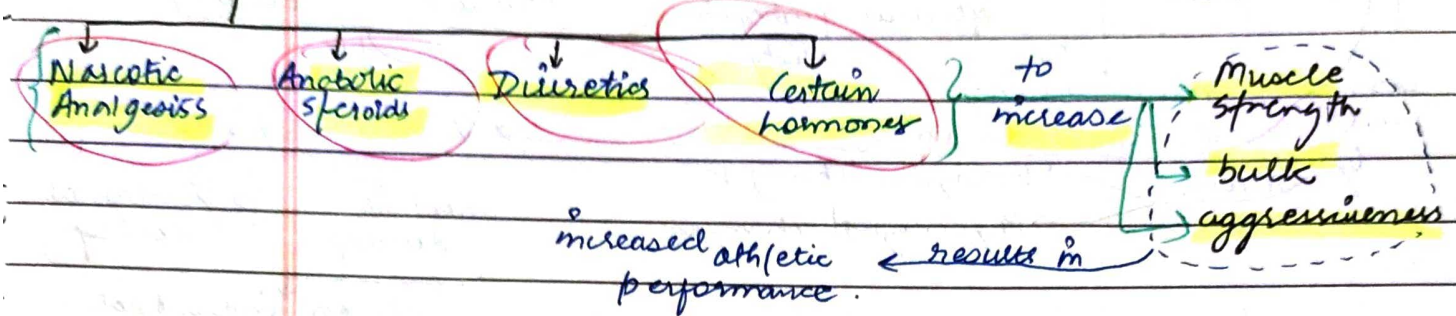
* Using drug once → **fore runner** to addiction

Effects of Drug/Alcohol Abuse





Misuse of Drugs by Sports person to enhance their performance



★ Side effects of use of Anabolic steroids in

Females

Adolescent male/Female

Males

<ul style="list-style-type: none"> ◦ Masculinisation ◦ Increased aggressiveness ↑ ◦ mood swings ◦ Depression ◦ Abnormal Menstrual cycle ◦ Excessive hair growth on face & body ◦ Enlargement of clitoris ◦ Deepening of female voice 	<ul style="list-style-type: none"> ◦ Severe facial & Body acne ◦ Premature closure of growth centres of long bones ↓ results in stunted growth 	<ul style="list-style-type: none"> ◦ acne ◦ ↑ aggressiveness ◦ mood swings ◦ Depression ◦ Reduction in size of testicles ◦ Decreased sperm production ◦ Potential for dysfunction of kidney & liver ◦ Breast enlargement ◦ Premature Baldness ◦ Enlargement of prostate gland
--	--	---

* The effect may be permanent with prolonged use.

* Prevention & control → "Prevention is better than cure" → drug & alcohol abuse for

- 1) Avoid undue peer pressure
- 2) Education & counselling
- 3) Seeking help from parents & peers
- 4) Looking for danger signs
- 5) seeking professional & medical help.

TANISHA SACHAN
 AIR 1747
 NCERT THREAD NOTES